

Plight of red-legged frog illustrates problem of exotic species

Remove a frog to save a frog? To some, eradicating one species to save another doesn't make any sense. Despite this irony, biologists commonly face this dilemma in their everyday effort to conserve biological diversity.

The intentional or unintentional release of animals and plants outside of their native habitat or geographical region into another region can have a dramatic, lasting and unforeseeable impact on native species and habitats. At a minimum the result may be competition for survival and predation. Much worse is the potential for population extirpation (i.e., localized extinction) and extinction. Furthermore, the issue of exotic species introductions and impact on native species and habitats goes way beyond the borders of any county, state or country; the issue at hand is a global phenomenon changing the species make-up of each and every country on the planet.

As stated, most exotic species invasions result in the displacement or replacement of native species. When coupled with other population pressures, such as habitat destruction and modification, climate change or pesticides, the synergistic effect has the potential to be catastrophic. Case in point is the California red-legged frog (*Rana aurora draytonii*). It is California's largest native frog and was once found from Redding, Calif. to Baja, Mexico, but is now extirpated from 70 percent of its historic range. Most California red-legged frog population declines can be attributed to habitat loss and modification. But now more than ever, the remaining population segments are threatened by the spread of species introduced from the southeastern United States such as bullfrogs (*Rana catesbeiana*) and Centrarchid fish (i.e., bass, bluegill, etc.). In other words, habitat loss and exotic species invasion are recognized as the proverbial one-two punch leading to extinction.

LLNL's wildlife biologists are smack dab in the middle of this struggle, faced with exotic species at both the



By Michael G. van Hattem



California's biodiversity is world-renowned but is in jeopardy. The California red-legged frog has declined through much of its historic range and is protected under the U.S. Endangered Species Act. Predation by exotic species has greatly contributed to its decline.



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A grim ecological reality: the necropsy of a 2-year-old bullfrog revealed 10 native pacific treefrogs (*Hyla regilla*) in its stomach contents. This bullfrog was removed from the Drainage Retention Basin at the Livermore Site.



DAVID COOK, SONOMA COUNTY, CA

Bullfrogs prey upon all frog species. A large adult bullfrog that attempted to consume an adult California red-legged frog and suffocated on it as a result (note feet protruding from the bullfrog's mouth).



DAVID COOK, SONOMA COUNTY, CA

The adult California red-legged frog removed from the bullfrog at left. A ruler illustrates the size discrepancy between the two species.

Livermore Site and Site 300.

At the Livermore Site, the centrally located Drainage Retention Basin has unfortunately become a repository for numerous exotic species. The DRB has a range of management objectives (see previous DRB Wildside article), including managing the lake in ways beneficial to the California red-legged frog. Exotic fish have recently been released into the basin in large numbers by an unknown source resulting in a situation that biologists need to remedy. The federal Endangered Species Act (Act) and Executive Order 13112 call for federal agencies to further the purposes of the act by engaging in conservation actions (help recover endangered species) and by limiting the spread of exotic species that threaten biological diversity.

The seemingly innocuous act of relocating, releasing or introducing species outside of their historic range, has very significant, harmful ramifications (not to mention it's illegal without permits). The act of stocking the DRB with bass and bullfrogs dramatically affects the survival of (endangered) native species already in peril. It is our responsibility to help conserve the biological diversity of California for future generations. California's critters are at stake; extinction is final.

For more information on exotic species see the following Websites: <http://www.invasivespecies.gov/> or <http://tncweeds.ucdavis.edu/> or contact Michael van Hattem at 4-6795 for information about this article and LLNL's Invasive Species Program. View previous Wildside articles by this author and others at the LLNL Wildside Series Archives at <http://www-envirinfo.llnl.gov/>.